

WHAT IS CLAIMED IS:

- 1 1. A method for defining asset classes in a digital library, comprising:
2 defining at least one asset class to include at least one attribute;
3 defining attributes for each asset class to have an attribute object type;
4 defining the attribute object type to indicate one of a plurality of different data
5 structure formats that are searchable through separate application programs, wherein the
6 attribute object types in one asset class are implemented in different data structure
7 formats;
8 generating an asset object instance for each asset class; and
9 generating information in the asset object instance on a file location of attribute
10 objects providing the attributes for the generated asset object instance.
- 1 2. The method of claim 1, wherein generating asset object instances further
2 comprises:
3 generating attribute information into the asset object instance for at least one
4 attribute object of the asset object instance.
- 1 3. The method of claim 1, wherein one object type comprises a database
2 object and a second object type comprises a text file, wherein one asset class has at least
3 one attribute defined to have a text attribute object and one attribute defined to have a
4 database attribute object.
- 1 4. The method of claim 3, wherein a third object type comprises a
2 multimedia file, wherein one attribute is defined to have an attribute object comprising at
3 least one multimedia file.
- 1 5. The method of claim 1, wherein attributes for an asset class are defined to
2 include an attribute name, attribute value type, and an attribute file location of the
3 attribute object, wherein when generating the asset object instances further comprises:

4 generating values in the generated asset object instance for the attribute name, the
5 attribute value type, and the attribute file location for attribute objects.

1 6. The method of claim 1, wherein one attribute is defined to include a
2 plurality of sub-attributes, wherein sub-attributes are defined to include a sub-attribute
3 name, a sub-attribute value type, and a sub-attribute file location, wherein generating
4 asset object instances further comprises:
5 generating values in the generated asset object instance for the sub-attribute name,
6 the sub-attribute value type, and the sub-attribute file location for a sub-attribute object.

1 7. The method of claim 1, wherein one attribute type comprises a
2 relationship attribute indicating a relationship attribute object defining an association of a
3 first and second asset types.

1 8. The method of claim 7, wherein the relationship attribute includes a
2 relationship location indicating a file location of the relationship attribute object.

1 9. The method of claim 7, wherein the relationship attribute object comprises
2 a database table, wherein a first column in the database table is for unique identifiers of
3 instances of the first asset type and a second column in the database table is for unique
4 identifiers of instances of the second asset type, wherein a row in the database table
5 identifies one instance of the first asset type identified by the unique identifier in the first
6 column of the row that is associated with one instance of the second asset type identified
7 by the unique identifier in the second column of the row.

1 10. The method of claim 1, wherein the definition of each attribute for each
2 asset is implemented in at least one computer data structure.

1 11. The method of claim 10, wherein the definition of each attribute for an
2 asset class is implemented in an Extensible Markup Language (XML) document, wherein
3 each defined attribute for an asset class comprises a tagged element in the XML
4 document and wherein information for each attribute is embedded in at least one tagged
5 attribute of the tagged element for the attribute.

1 12. The method of claim 11, wherein the definition of the attribute objects for
2 each asset object instance is maintained in tagged elements of an XML file

1 13. The method of claim 1, wherein the asset classes provide information on a
2 film production, wherein the defined asset classes include a movie asset class, a scene
3 asset class, a background asset class, and a character asset class, wherein the attribute
4 objects provide information on instances of movie, scene, background, and character
5 assets.

1 14. The method of claim 1, further comprising:
2 defining an additional attribute for one asset class after an instance for the asset
3 class has been generated, wherein defining the additional attribute does not affect
4 instances of the asset class generated before the additional attribute for the asset class
5 was defined.

1 15. A system for maintaining information, comprising:
2 a digital library;
3 means for defining at least one asset in the digital library class to include at least
4 one attribute;
5 means for defining attributes for each asset class to have an attribute object type;
6 means for defining the attribute object type to indicate one of a plurality of
7 different data structure formats that are searchable through separate application

8 programs, wherein the attribute object types in one asset class are implemented in
9 different data structure formats;
10 means for generating an asset object instance for each asset class; and
11 means for generating information in the asset object instance on a file location of
12 attribute objects providing the attributes for the generated asset object instance.

1 16. The system of claim 15, wherein the means for generating asset object
2 instances further performs:
3 generating attribute information into the asset object instance for at least one
4 attribute object of the asset object instance.

1 17. The system of claim 15, wherein one object type comprises a database
2 object and a second object type comprises a text file, wherein one asset class has at least
3 one attribute defined to have a text attribute object and one attribute defined to have a
4 database attribute object.

1 18. The system of claim 17, wherein a third object type comprises a
2 multimedia file, wherein one attribute is defined to have an attribute object comprising at
3 least one multimedia file.

1 19. The system of claim 15, wherein one attribute type comprises a
2 relationship attribute indicating a relationship attribute object defining an association of a
3 first and second asset types.

1 20. The system of claim 15, wherein the relationship attribute includes a
2 relationship location indicating a file location of the relationship attribute object.

1 21. The system of claim 15, wherein the definition of each attribute for an
2 asset class is implemented in an Extensible Markup Language (XML) document, wherein

3 each defined attribute for an asset class comprises a tagged element in the XML
4 document and wherein information for each attribute is embedded in at least one tagged
5 attribute of the tagged element for the attribute.

1 22. The system of claim 15, further comprising:
2 means for defining an additional attribute for one asset class after an instance for
3 the asset class has been generated, wherein the means for defining the additional attribute
4 does not affect instances of the asset class generated before the additional attribute for the
5 asset class was defined.

1 23. An article of manufacture including code for defining asset classes in a
2 digital library, wherein the code causes operations comprising:
3 defining at least one asset class to include at least one attribute;
4 defining attributes for each asset class to have an attribute object type;
5 defining the attribute object type to indicate one of a plurality of different data
6 structure formats that are searchable through separate application programs, wherein the
7 attribute object types in one asset class are implemented in different data structure
8 formats;
9 generating an asset object instance for each asset class; and
10 generating information in the asset object instance on a file location of attribute
11 objects providing the attributes for the generated asset object instance.

1 24. The article of manufacture of claim 23, wherein generating asset object
2 instances further comprises:
3 generating attribute information into the asset object instance for at least one
4 attribute object of the asset object instance.

1 25. The article of manufacture of claim 23, wherein one object type comprises
2 a database object and a second object type comprises a text file, wherein one asset class

3 has at least one attribute defined to have a text attribute object and one attribute defined
4 to have a database attribute object.

1 26. The article of manufacture of claim 25, wherein a third object type
2 comprises a multimedia file, wherein one attribute is defined to have an attribute object
3 comprising at least one multimedia file.

1 27. The article of manufacture of claim 23, wherein attributes for an asset
2 class are defined to include an attribute name, attribute value type, and an attribute file
3 location of the attribute object, wherein when generating the asset object instances further
4 comprises:
5 generating values in the generated asset object instance for the attribute name, the
6 attribute value type, and the attribute file location for attribute objects.

1 28. The article of manufacture of claim 23, wherein one attribute type
2 comprises a relationship attribute indicating a relationship attribute object defining an
3 association of a first and second asset types.

1 29. The article of manufacture of claim 28, wherein the relationship attribute
2 includes a relationship location indicating a file location of the relationship attribute
3 object.

1 30. The article of manufacture of claim 23, wherein the definition of each
2 attribute for an asset class is implemented in an Extensible Markup Language (XML)
3 document, wherein each defined attribute for an asset class comprises a tagged element in
4 the XML document and wherein information for each attribute is embedded in at least
5 one tagged attribute of the tagged element for the attribute.

1 31. The article of manufacture of claim 23, further comprising:
2 defining an additional attribute for one asset class after an instance for the asset
3 class has been generated, wherein defining the additional attribute does not affect
4 instances of the asset class generated before the additional attribute for the asset class
5 was defined.

 32. A computer-readable medium including data structures for maintaining
1 information on asset classes in a digital library, comprising:
2 a definition of at least one asset class including at least one attribute;
3 a definition of attributes for each asset class having an attribute object type;
4 a definition of the attribute object type indicating one of a plurality of different
5 data structure formats that are searchable through separate application programs, wherein
6 the attribute object types in one asset class are implemented in different data structure
7 formats;
8 an asset object instance for each asset class; and
9 information in the asset object instance on a file location of attribute objects
10 providing the attributes for the generated asset object instance.

1 33. The computer readable medium of claim 32, wherein the asset object
2 instances further comprise:
3 attribute information for at least one attribute object of the asset object instance.

1 34. The computer readable medium of claim 32, wherein one object type
2 comprises a database object and a second object type comprises a text file, wherein the
3 definition of one asset class has at least one attribute defined to have a text attribute
4 object and one attribute defined to have a database attribute object.

1 35. The computer readable medium of claim 34, wherein a third object type
2 comprises a multimedia file, wherein the definition for one attribute indicates an attribute
3 object comprising at least one multimedia file.

1 36. The computer readable medium of claim 32, wherein the definition of
2 attributes for an asset class include an attribute name, attribute value type, and an
3 attribute file location of the attribute object, wherein the definition of the asset object
4 instances further includes:
5 values for the attribute name, the attribute value type, and the attribute file
6 location for attribute objects.

1 37. The computer readable medium of claim 32, wherein one defined attribute
2 type comprises a relationship attribute indicating a relationship attribute object defining
3 an association of a first and second asset types.

1 38. The computer readable medium of claim 37, wherein the relationship
2 attribute includes a relationship location indicating a file location of the relationship
3 attribute object.

1 39. The computer readable medium of claim 32, wherein the definition of
2 each attribute for an asset class is implemented in an Extensible Markup Language
3 (XML) document, wherein each defined attribute for an asset class comprises a tagged
4 element in the XML document and wherein information for each attribute is embedded in
5 at least one tagged attribute of the tagged element for the attribute.

1 40. The computer readable medium of claim 32, further comprising:
2 a definition of an additional attribute for one asset class generated after an
3 instance for the asset class was generated, wherein defining the additional attribute does

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- | Country | Year | Population (millions) | Urban population (millions) | Urban population (%) | Population (millions) | Urban population (millions) | Urban population (%) |
|---------|------|-----------------------|-----------------------------|----------------------|-----------------------|-----------------------------|----------------------|
| Algeria | 1980 | 10.0 | 4.0 | 40.0 | 1980 | 4.0 | 40.0 |
| Algeria | 1985 | 10.5 | 4.5 | 42.9 | 1985 | 4.5 | 42.9 |
| Algeria | 1990 | 11.0 | 5.0 | 45.5 | 1990 | 5.0 | 45.5 |
| Algeria | 1995 | 11.5 | 5.5 | 47.8 | 1995 | 5.5 | 47.8 |
| Algeria | 2000 | 12.0 | 6.0 | 50.0 | 2000 | 6.0 | 50.0 |
| Algeria | 2005 | 12.5 | 6.5 | 52.0 | 2005 | 6.5 | 52.0 |
| Algeria | 2010 | 13.0 | 7.0 | 53.8 | 2010 | 7.0 | 53.8 |
| Algeria | 2015 | 13.5 | 7.5 | 55.6 | 2015 | 7.5 | 55.6 |
| Algeria | 2020 | 14.0 | 8.0 | 57.1 | 2020 | 8.0 | 57.1 |
| Algeria | 2025 | 14.5 | 8.5 | 58.6 | 2025 | 8.5 | 58.6 |
| Algeria | 2030 | 15.0 | 9.0 | 60.0 | 2030 | 9.0 | 60.0 |
| Algeria | 2035 | 15.5 | 9.5 | 61.3 | 2035 | 9.5 | 61.3 |
| Algeria | 2040 | 16.0 | 10.0 | 62.5 | 2040 | 10.0 | 62.5 |
| Algeria | 2045 | 16.5 | 10.5 | 63.6 | 2045 | 10.5 | 63.6 |
| Algeria | 2050 | 17.0 | 11.0 | 64.7 | 2050 | 11.0 | 64.7 |
| Algeria | 2055 | 17.5 | 11.5 | 65.7 | 2055 | 11.5 | 65.7 |
| Algeria | 2060 | 18.0 | 12.0 | 66.7 | 2060 | 12.0 | 66.7 |
| Algeria | 2065 | 18.5 | 12.5 | 67.6 | 2065 | 12.5 | 67.6 |
| Algeria | 2070 | 19.0 | 13.0 | 68.4 | 2070 | 13.0 | 68.4 |
| Algeria | 2075 | 19.5 | 13.5 | 69.2 | 2075 | 13.5 | 69.2 |
| Algeria | 2080 | 20.0 | 14.0 | 70.0 | 2080 | 14.0 | 70.0 |
| Algeria | 2085 | 20.5 | 14.5 | 70.7 | 2085 | 14.5 | 70.7 |
| Algeria | 2090 | 21.0 | 15.0 | 71.4 | 2090 | 15.0 | 71.4 |
| Algeria | 2095 | 21.5 | 15.5 | 72.1 | 2095 | 15.5 | 72.1 |
| Algeria | 2100 | 22.0 | 16.0 | 72.7 | 2100 | 16.0 | 72.7 |
| Algeria | 2105 | 22.5 | 16.5 | 73.3 | 2105 | 16.5 | 73.3 |
| Algeria | 2110 | 23.0 | 17.0 | 73.9 | 2110 | 17.0 | 73.9 |
| Algeria | 2115 | 23.5 | 17.5 | 74.5 | 2115 | 17.5 | 74.5 |
| Algeria | 2120 | 24.0 | 18.0 | 75.0 | 2120 | 18.0 | 75.0 |
| Algeria | 2125 | 24.5 | 18.5 | 75.5 | 2125 | 18.5 | 75.5 |
| Algeria | 2130 | 25.0 | 19.0 | 76.0 | 2130 | 19.0 | 76.0 |
| Algeria | 2135 | 25.5 | 19.5 | 76.5 | 2135 | 19.5 | 76.5 |
| Algeria | 2140 | 26.0 | 20.0 | 76.9 | 2140 | 20.0 | 76.9 |
| Algeria | 2145 | 26.5 | 20.5 | 77.3 | 2145 | 20.5 | 77.3 |
| Algeria | 2150 | 27.0 | 21.0 | 77.8 | 2150 | 21.0 | 77.8 |
| Algeria | 2155 | 27.5 | 21.5 | 78.2 | 2155 | 21.5 | 78.2 |
| Algeria | 2160 | 28.0 | 22.0 | 78.6 | 2160 | 22.0 | 78.6 |
| Algeria | 2165 | 28.5 | 22.5 | 78.9 | 2165 | 22.5 | 78.9 |
| Algeria | 2170 | 29.0 | 23.0 | 79.3 | 2170 | 23.0 | 79.3 |
| Algeria | 2175 | 29.5 | 23.5 | 79.7 | 2175 | 23.5 | 79.7 |
| Algeria | 2180 | 30.0 | 24.0 | 80.0 | 2180 | 24.0 | 80.0 |
| Algeria | 2185 | 30.5 | 24.5 | 80.3 | 2185 | 24.5 | 80.3 |
| Algeria | 2190 | 31.0 | 25.0 | 80.6 | 2190 | 25.0 | 80.6 |
| Algeria | 2195 | 31.5 | 25.5 | 81.0 | 2195 | 25.5 | 81.0 |
| Algeria | 2200 | 32.0 | 26.0 | 81.3 | 2200 | 26.0 | 81.3 |
| Algeria | 2205 | 32.5 | 26.5 | 81.6 | 2205 | 26.5 | 81.6 |
| Algeria | 2210 | 33.0 | 27.0 | 81.8 | 2210 | 27. | |